Amendments to Claims:

Please cancel without prejudice claim 67, amend claims 19, 61, 64, 66, 68, 69, 73, 75, 77 and 78 as indicated, and add claims 80 and 81. This listing of claims will replace all prior versions and listings of claims in the application.

1. (Original) Apparatus for generating an output dependant upon the impedance or at least one component of the impedance of a device, the apparatus comprising:

a load component having a known impedance or at least one component thereof for connection in series with said device;

a signal generating arrangement for generating an electrical signal for application to the series connected load component and device;

a measurement channel for measuring voltages;

a switch arrangement connected to said measurement channel for switching the measurement channel to sequentially measure a first voltage on a first side of said load component, and one of a second voltage on a second side of said load component or a voltage difference across said load component; and

a processing arrangement connected to said measurement channel for processing the sequentially measured voltages to generate an output dependant upon said impedance or said at least one component of impedance of said device.

2. (Original) Apparatus according to claim 1, wherein said signal generating arrangement is adapted to generate said signal comprising sequential signal blocks for application to said series connected load component and device, wherein said switch arrangement is adapted to switch said measurement channel to measure each of said voltages during the same part of the signal block of sequential signal blocks of said signal.

3. (Original) Apparatus according to claim 2, wherein said signal generating arrangement includes a digital store storing a signal pattern for at least a part of a said signal block, generator means for generating a digital signal by repeatedly using the stored signal pattern, and a digital-to-analogue converter for converting the digital signal to the signal.

4. (Original) Apparatus according to claim 3, wherein said signal generating arrangement

and said processing arrangement are adapted to operate synchronously.

5. (Original) Apparatus according to claim 1, including a plurality of said measurement channels for measuring said voltages, wherein said switching arrangement is adapted to switch each of said measurement channels to sequentially measure said voltages to allow simultaneous measurements in the measurement channels, and said processing arrangement is adapted to process the sequentially measured voltages for each channel.

6. (Original) Apparatus according to claim 5, wherein said processing arrangement comprises a digital processing arrangement, and said measurement channels include a common multiplexer arrangement and a common analogue-to-digital converter.

7. (Original) Apparatus according to claim 1, wherein said processing arrangement is adapted to generate the output as a measure of impedance or at least one component of the impedance of said device.

8. (Original) Apparatus according to claim 1, wherein said processing means is adapted to generate said output as an indication of whether or not a factor related to the impedance or at least one component thereof is above or below a threshold.

9. (Original) Apparatus according to claim 8, wherein said processing arrangement is adapted to:

determine a first parameter indicative of the complex amplitude of the first voltage on a first side of said load component connected to said device, and a second parameter indicative of the complex amplitude of the difference between the first and second voltages or said voltage difference;

multiply each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively; and

compare said third and fourth parameters to generate said output, or compare one or more components or derivatives of the third parameter and one or more components or derivatives of said fourth parameter to generate said output.

10. (Original) Apparatus according to claim 9, wherein said processing arrangement is

adapted to include an averaging process in the generation of said third and fourth parameters.

11. (Original) Apparatus according to claim 9, wherein said processing arrangement is adapted to multiply said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated signal is a part to determine said first parameter, to multiply said second voltage measurement by said factor to determine an interim parameter, and to subtract said first parameter from said interim parameter to determine said second parameter.

12. (Original) Apparatus according to claim 9, wherein said processing arrangement is adapted to multiply said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated signal is a part to determine said first parameter, to determine a difference voltage using said first and second voltage measurements, and to multiply said difference voltage by said factor to determine said second parameter.

13. (Original) Apparatus according to claim 9, wherein said processing arrangement is adapted to multiply said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated electrical signal is a part to determine said first parameter, and to multiply said voltage difference measurement by said factor to determine said second parameter.

14. (Original) Apparatus according to claim 11, wherein said measurement channel includes an analogue-to-digital converter for generating digital voltage measurements from said voltage measurements, and said processing arrangement is adapted to multiply each voltage measurement by said factor and to sum each of the digital voltage measurements multiplied by said factor over a plurality of digital samples.

15. (Original) Apparatus according to claim 8, wherein said signal generating arrangement is adapted to generate said electrical signal comprising a plurality of frequency components and said processing arrangement is adapted to determine a first parameter indicative of the complex amplitude of the first voltage on said first side of said load component for each said frequency, and a second parameter indicative of the complex amplitude of the difference between the first and second voltages or said voltage difference for each said frequency, to

multiply each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively, and to compare said third and fourth parameters to generate said output, or compare one or more components or derivatives of the third and fourth parameters to generate said output.

16. (Original) Apparatus according to claim 9, wherein said processing arrangement is adapted to compare said third and fourth parameters using a constant, wherein said constant is dependent upon an impedance or at least one component of impedance of said load component.

17. (Original) Apparatus according to claim 16, wherein said processing arrangement is adapted to compare said third and fourth parameters to generate said output by comparing the result of multiplying each said fourth parameter by said constant with each said third parameter; wherein said constant includes the reciprocal of the impedance or part thereof of said load component.

18. (Original) Apparatus according to claim 9, wherein said processing arrangement is adapted to determine an estimate of noise in the measurements using averages of said third and fourth parameters over a plurality of measurements, and to ignore the current comparison of said third and fourth parameters if said noise is above a threshold.

19. (Presently amended) A method of generating an output dependent upon the impedance or at least one component of the impedance of a device, the method comprising:

connecting a load component having a known impedance or at least one component thereof in series with said device;

applying an electrical signal to ~~said electrical arrangement to generate said parameters~~ <u>the series connected load component and device</u>;

using a measurement channel to sequentially measure a first voltage on a first side of said load component, and one of a second voltage on a second side of said load component or a voltage difference across said load component; and

processing the sequentially measured voltages to generate an output dependent upon said impedance or at least one component of the impedance of said device.

20. (Original) A method according to claim 19, wherein said signal is generated as a signal comprising sequential signal blocks for application to said series connected load component and device, wherein said measurement channel is used to measure each of said voltages during the same part of the signal block of sequential signal blocks of said signal.

21. (Original) A method according to claim 20, including storing a signal pattern for at least a part of a signal block, digitally generating a digital signal by repeatedly using the stored signal pattern, and digital-to-analogue converting the digital signal to generate the signal.

22. (Original) A method according to claim 19, wherein the signal generation and the processing are synchronous.

23. (Original) A method according to claim 19, including using a plurality of said measurement channels for measuring said voltages, using each of said measurement channels to sequentially measure said voltages to allow simultaneous measurements in the measurement channels, and processing the sequentially measured voltages for each channel.

24. (Original) A method according to claim 19, wherein said processing comprises digital processing, and said measurement channels include a common multiplexer arrangement and a common analogue-to-digital converter.

25. (Original) A method according to claim 19, wherein said processing generates the output as a measure of impedance or at least one component of the impedance of said device.

26. (Original) A method according to claim 19, wherein the processing generates said output as an indication of whether or not a factor related to the impedance or at least one component of the impedance is above or below a threshold.

27. (Original) A method according to claim 19, wherein said processing includes

determining a first parameter indicative of the complex amplitude of the first voltage on a first side of said load device connected to said device, and a second parameter indicative of the complex amplitude of a difference between the first and second voltages or said voltage

difference;

multiplying each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively; and

comparing said third and fourth parameters to generate said result.

28. (Original) A method according to claim 27, including repeating said determining step to determine a plurality of first and second parameters, repeating said multiplying step to generate a plurality of said third and fourth parameters, and averaging said third and fourth parameters, wherein said comparing step comprises comparing the averaged third and fourth parameters.

29. (Original) A method according to claim 27, wherein said signal is generated as a complex signal and a sinusoidal signal is derived from said signal for application to the series connected load component and device, said processing includes multiplying said first voltage measurement by a factor based on a phase inverse of the generated electrical signal to determine said first parameter, multiplying said second voltage measurement by a factor based on a phase inverse of the generated electrical signal to determine an interim parameter, and subtracting said first parameter from said interim parameter to determine said second parameter.

30. (Original) A method according to claim 27, wherein said processing includes multiplying said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated signal is a part to determine said first parameter, determining a difference voltage using said first and second voltage measurements, and multiplying said difference voltage by said factor to determine said second parameter.

31. (Original) A method according to any claim 27, wherein said processing includes multiplying said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated electrical signal is a part to determine said first parameter, and multiplying said voltage difference measurement by said factor to determine said second parameter.

32. (Original) A method according to claim 27, wherein said measurement channel includes an analogue-to-digital converter for generating digital voltage measurements from said voltage measurements, and said multiplying includes summing each of the digital voltage measurements multiplied by said factor over a plurality of digital samples.

33. (Original) A method according to claim 26, wherein said electrical signal comprises a plurality of frequency components and said processing includes determining a first parameter indicative of the complex amplitude of the first voltage on said first side of said load component for each said frequency, and a second parameter indicative of the complex amplitude of the difference between the first and second voltages or said voltage difference for each said frequency, multiplying each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively, and comparing said third and fourth parameters to generate said output, or comparing one or more components or derivatives of the third and fourth parameters to generate said output.

34. (Original) A method according to claim 33, including repeating said determining step to determine a plurality of first and second parameters, repeating said multiplying step to generate a plurality of said third and fourth parameters, and averaging said third and fourth parameters, wherein said comparing step comprises comparing the averaged third and fourth parameters.

35. (Original) A method according to claim 27, wherein said processing includes comparing said third and fourth parameters using a constant, wherein said constant is dependent upon an impedance or at least one component of the impedance of said load component.

36. (Original) A method according to claim 35, wherein said processing includes comparing said third and fourth parameters to generate said result by comparing the result of multiplying each said fourth parameter by said constant with each said third parameter; wherein said constant includes the reciprocal of the impedance or part thereof of said load component.

37. (Original) A method according to claim 27, wherein said processing includes determining an estimate of noise in the measurements using averages of said third and fourth parameters over a plurality of measurements, and ignoring the current comparison of said third and fourth parameters if said noise is above a threshold.

38. (Original) Apparatus for generating an output dependent upon the impedance or at least one component of the impedance of a device, the apparatus comprising:

a load component having a known impedance or at least one component thereof for connection in series with the device to allow for the measurement of a voltage drop across the load component;

a generator arrangement for applying a signal having a voltage to the series connected load component and device;

a measurement arrangement adapted to measure a first voltage one side of said load component, and one of a second voltage on the other side of said load component or a difference voltage comprising the voltage difference across said load device; and

a signal processing arrangement for processing the measurements to generate an output dependent upon the impedance or at least one component of the impedance of the device, wherein said processing arrangement is adapted to:

determine a first parameter indicative of the complex amplitude of the first voltage on a first side of said load component connected to said device, and a second parameter indicative of the complex amplitude of said difference voltage or a calculated difference voltage comprising the difference between the first and second voltages;

multiply each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively; and

compare said third and fourth parameters to generate an output or compare one or more components or derivatives of the third parameter and said fourth parameter to generate said output.

39. (Original) Apparatus according to claim 38, wherein said signal processing arrangement is adapted to include an averaging process in the generation of said third and fourth parameters.

40. (Original) Apparatus according to claim 38, wherein said signal processing

arrangement is adapted to multiply said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated electrical signal is a part to determine said first parameter, to multiply said second voltage measurement by said factor to determine an interim parameter, and to subtract said first parameter from said interim parameter to determine said second parameter.

41. (Original) Apparatus according to claim 38, wherein said signal processing arrangement is adapted to multiply said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated electrical signal is a part to determine said first parameter, to determine a voltage difference using said first and second voltage measurements, and to multiply said voltage difference by said factor to determine said second parameter.

42. (Original) Apparatus according to claim 38 , wherein said processing arrangement is adapted to multiply said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated electrical signal is a part to determine said first parameter, to multiply said difference voltage measurement by said factor to determine said second parameter.

43. (Original) Apparatus according to claim 40, wherein said measurement channel includes an analogue-to-digital converter for generating digital voltage measurements from said voltage measurements, said signal processing arrangement is adapted to perform the multiplication of said measurement by said factor and to sum each of the digital voltage measurements multiplied by said factor over a plurality of digital samples.

44. (Original) Apparatus according to claim 38, wherein said signal processing arrangement is adapted to generate said electrical signal comprising a plurality of frequency components and said processing arrangement is adapted to determine a first parameter indicative of the complex amplitude of the first voltage on said first side of said load component for each said frequency, and a second parameter indicative of the complex amplitude of the difference between the first and second voltages or said voltage difference for each said frequency, to multiply each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth

parameters respectively, and to compare said third and fourth parameters to generate said output, or compare one or more components or derivatives of the third and fourth parameters to generate said output.

45. (Original) Apparatus according to claim 38, wherein said signal processing arrangement is adapted to compare said third and fourth parameters using a constant, wherein said constant is dependent upon the impedance or at least one component of the impedance of said load component.

46. (Original) Apparatus according to claim 45, wherein said signal processing arrangement is adapted to compare said third and fourth parameters to generate said output by comparing the result of multiplying each said fourth parameter by said constant with each said third parameter; wherein said constant includes the reciprocal of the impedance or part thereof of said load component.

47. (Original) Apparatus according to claim 38, wherein said signal processing arrangement is adapted to determine an estimate of noise in the measurements using averages of said third and fourth parameters over a plurality of measurements, and to ignore the current comparison of said third and fourth parameter if said noise is above a threshold.

48. (Original) A method of generating an output dependent upon the impedance or at least one component of the impedance of a device, the method comprising:

connecting a load component having a known impedance or at least one component of the impedance in series with the device to allow for the measurement of a voltage drop across the load component;

applying a signal having a voltage to the series connected load component and device;

measuring a first voltage one side of said load component, and a second voltage on the other side of said load component or a difference voltage comprising the voltage difference across said load device; and

processing the measurements to generating an output dependent upon the impedance or at least one component thereof, wherein said processing comprises:

determining a first parameter indicative of the complex amplitude of the first voltage on a first side of said load component connected to said device, and a second parameter

indicative of the complex amplitude of said difference voltage or a calculated difference voltage comprising the difference between the first and second voltages;

multiplying each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively; and

comparing said third and fourth parameters to generate said output or comparing one or more components or derivatives of the third parameter and said fourth parameter.

49. (Original) A method according to claim 48, including repeating said determining step to determine a plurality of first and second parameters, repeating said multiplying step to generate a plurality of said third and fourth parameters, and averaging said third and fourth parameters, wherein said comparing step comprises comparing the averaged third and fourth parameters.

50. (Original) A method according to claim 48, wherein said processing includes multiplying said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated electrical signal is a part to determine the first parameter, multiplying said second voltage measurement by said factor to determine an interim parameter, and subtracting said first parameter from said interim parameter to determine said second parameter.

51. (Original) A method according to claim 48, wherein said processing including multiplying said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated signal is a part to determine said first parameter, determining a difference voltage using said first and second voltage measurements, and multiplying said difference voltage by said factor to determine said second parameter.

52. (Original) A method according to claim 48 , wherein said processing includes multiplying said first voltage measurement by a factor based on a phase inverse of a complex signal of which the generated signal is a part to determine said first parameter, and multiplying said voltage difference measurement by said factor to determine said second parameter.

53. (Original) A method according to claim 48, wherein said measurement channel includes an analogue-to-digital converter for generating digital voltage measurements from said voltage measurements, said multiplying includes summing each of the digital voltage measurements multiplied by said factor based on a phase inverse of the generated signal over a plurality of digital samples.

54. (Original) A method according to claim 48, wherein said electrical signal comprises a plurality of frequency components and said processing includes determining a first parameter indicative of the complex amplitude of the first voltage on said first side of said load component for each said frequency, and a second parameter indicative of the complex amplitude of the difference between the first and second voltages or said voltage difference for each said frequency, multiplying each of the first and second determined parameters by the complex conjugate of the second determined parameter to generate third and fourth parameters respectively, and comparing said third and fourth parameters to generate said output, or comparing one or more components or derivatives of the third and fourth parameters to generate said output.

55. (Original) A method according to claim 54, including repeating said determining step to determine a plurality of first and second parameters, repeating said multiplying step to generate a plurality of said third and fourth parameters, and averaging said third and fourth parameters, wherein said comparing step comprises comparing the averaged third and fourth parameters.

56. (Original) A method according to claim 48, wherein said processing includes comparing said third and fourth parameters using a constant, wherein said constant is dependent upon the impedance or part thereof of said load component.

57. (Original) A method according to claim 56, wherein said processing includes comparing said third and fourth parameters by comparing the result of multiplying each said fourth parameter by said constant with each said third parameter; wherein said constant includes the reciprocal of the impedance or part thereof of said load component.

58. (Original) A method according to claim 48, wherein said processing includes

determining an estimate of noise in the measurements using averages of said third and fourth parameters over a plurality of measurements, and ignoring the current comparison of said third and fourth parameters if said noise is above a threshold.

59. (Original) Apparatus for generating an output in dependence upon the impedance or at least one component of the impedance of a device, the apparatus comprising:

a load component having a known impedance or at least one component of impedance for connection in series with the device to allow for the measurement of a voltage drop across the load component;

a generator arrangement for applying a voltage signal to the series connected load component and device;

a measurement channel for measuring voltage;

a switch arrangement for switching the measurement channel to sequentially measure a first voltage one side of said load component and a second voltage on the other side of said load component or a difference voltage across said load component; and

a signal processing arrangement for processing the measurements to generate an output in dependence upon the impedance or at least one component of the impedance.

60. (Original) A method of generating an output in dependence upon the impedance or at least one component of the impedance of a device, the method comprising:

connecting a load component having a known impedance or at least one component of the impedance in series with the device to allow for the measurement of a voltage drop across the load component;

applying a voltage signal to the series connected load component and device;

sequentially measuring a first voltage one side of said load component and a second voltage on the other side of said load component or a difference voltage across said load component using a measurement channel; and

processing the measurements to generate an output in dependence upon the impedance or at least one component of the impedance.

61. (Presently amended) A method of calibrating <u>an</u> apparatus<u>, the apparatus being adapted to</u> ~~for~~ generate<u>e</u> ~~ing~~ an output in dependence upon the impedance or at least one component of the impedance of a device, the apparatus including a load component having an

unknown impedance or at least one component thereof, and the method comprising:

connecting a test load component having a known impedance or at least one component thereof to said apparatus in place of said device and in series with said load component;

applying a voltage signal across said series connected test load component and load component;

obtaining measurements indicative of the voltage across said test load component and current in said test load component;

processing the measurements to determine a value dependent upon the impedance or at least one component of the impedance of the load component; and

storing the determined value for later use in the generation of an output.

62. (Original) A method according to claim 61, wherein said measurements comprise a first voltage one side of said test load component and a second voltage on the other side of said load component.

63. (Original) A method according to claim 61, wherein the value is dependent upon the reciprocal of the impedance or at least one component of the impedance of said load component.

64. (Presently amended) Apparatus for generating an output in dependence upon the impedance or at least one component of the impedance of a device, the apparatus comprising:

a load component having a known impedance or at least one component thereof for connection in series with said device;

a generator arrangement for applying a voltage signal ~~to~~ across said series connected load component and device;

a measurement arrangement adapted to measure the voltage across said device and a voltage drop across said load component to obtain a measurement of the current in said device;

a test load component having a known impedance or at least one component of the impedance for connection in place of said device and in series with said load component for calibration of said load component;

calibration processing means for processing the measurements when said test load

component is connected in place of said device to determine and store a value dependent upon the impedance or at least one component of the impedance of the load component; and

signal processing means for processing said measurements when said device is connected to generate an output in dependence upon the impedance or at least one component of the impedance of said device using the stored value.

65. (Original) Apparatus according to claim 64, wherein said calibration processing means is adapted to determine said value as the reciprocal of the impedance or at least one component of the impedance of said load component.

66. (Presently amended) A method of identifying a device having an impedance characteristic as a function of frequency, the method comprising:

applying ~~at least~~ ~~two frequency~~ signals of a first and second frequency to said device;

obtaining measurements indicative of a first voltage one side of said load component, and one of a second voltage on the other side of said load component or a difference voltage comprising the voltage difference across said load device, the measurements being obtained at both said frequencies~~the voltage across said device and the current flowing through said device at said frequencies~~;

determining a value dependent on the impedances for said device at said frequencies using said measurements, including the steps of:

determining first and second parameters indicative of the complex amplitude, at said first and second frequency respectively, of the first voltage on a first side of said load component connected to said device;

determining third and fourth parameters indicative of the complex amplitude, at said first and second frequency respectively, of said difference voltages or a calculated difference voltage comprising the difference between the first and second voltages;

multiplying each of the first and third determined parameters by the complex conjugate of the third determined parameter to generate fifth and sixth parameters respectively;

multiplying each of the second and fourth determined parameters by the complex conjugate of the fourth determined parameter to generate seventh and eighth parameters respectively; and

performing a comparison using said fifth, sixth, seventh and eighth parameters to determine said value or performing a comparison using one or more components or derivatives of said fifth, sixth, seventh and eighth parameters to determine said value; and

using said ~~impedances~~ value to identify said device.

67. (Cancelled)

68. (Presently amended) A method according to claim ~~67~~66, wherein said ~~impedances are~~ value is determined ~~compared~~ by testing the inequality between ~~one impedance~~ a constant multiplied by a first set of the parameters or values derived therefrom ~~times a constant~~ and ~~the other impedance~~ a second set of parameters or values derived therefrom.

69. (Presently amended) A method of identifying a device having an impedance characteristic as a function of frequency, the method comprising:

applying ~~at least two frequency~~ signals of a first and second frequency to said device;

obtaining first and second parameters indicative of the complex amplitude, at said first and second frequency respectively, of the first voltage on a first side of said load component connected to said device;

obtaining third and fourth parameters indicative of the complex amplitude, at said first and second frequency respectively, of said difference voltages or a calculated difference voltage comprising the difference between the first and second voltages;

multiplying each of the first and third parameters by the complex conjugate of the third determined parameter to generate fifth and sixth parameters respectively;

multiplying each of the second and fourth parameters by the complex conjugate of the fourth determined parameter to generate seventh and eight parameters respectively ~~parameters indicative of the voltage across said device and the current flowing through said device at said frequencies~~; and

comparing at least one of said parameters for said device with corresponding at least one parameters for at least one other device to identify said device.

70. (Original) A proximity sensor for sensing the proximity of a target comprising:

an electrical component for sensing the proximity of the target, said electrical component having electrical properties that vary with the proximity of the target;

a impedance component having a known impedance and a first end connected to a first end of said electrical component;

a switch connected to switch between said first end of said impedance component and a second end of said impedance component;

a signal generator connected to said second end of said impedance component for generating an electrical signal for application to the impedance component and electrical component;

an analogue-to-digital converter for receiving a digital signal and for generating a proximity signal, wherein said processor is adapted to control said switch to switch to connect to said first and second ends of said impedance component sequentially; and

a processor connected to the analogue-to-digital converter for receiving a digital voltage signal and for generating a proximity signal, wherein said processor is adapted to control said switch to switch to connect to said first and second ends of said impedance component sequentially.

71. (Original) Apparatus according to claim 70, wherein said electrical component comprises an inductor or a capacitor.

72. (Original) Apparatus according to claim 70, wherein said impedance component comprises a resistor or an inductor.

73. (Presently amended) Apparatus for generating an output dependent upon the impedance or at least one component of the impedance of a device, the apparatus comprising:

a load component having a known impedance for connection in series with the device to allow for the measurement of a voltage drop across the load component;

a generator arrangement for applying a voltage ~~to~~ <u>across</u> the series connected load component and device;

a measurement arrangement adapted to measure a first voltage one side of said load component, and a second voltage on the other side of said load component or a difference voltage comprising the voltage difference across said load device; and

a signal processing arrangement for processing the measurements to generate an

output dependent upon the impedance of said device;

wherein said signal processing arrangement is adapted to monitor said measurements to detect fault conditions in said device and to output a warning output if a fault condition is detected.

74. (Original) Apparatus according to claim 73, wherein said signal processing arrangement is adapted to detect a fault condition when at least one said measurement is outside a predetermined threshold or range.

75. (Presently amended) A method for generating an output dependent upon the impedance or at least one component of the impedance of a device, the method comprising:

connecting a load component having a known impedance in series with the device to allow for the measurement of a voltage drop ~~to~~ across the load component;

applying a voltage across the series connected load component and device;

measuring a first voltage on one side of said load component, and a second voltage on the other side of said load component or a difference voltage comprising the voltage difference across said load device;

processing the measurements to generating an output dependent upon the impedance of said device;

monitoring said measurements to detect fault conditions in said device and outputting a warning output if a fault condition is detected.

76. (Original) A method according to claim 75, wherein said monitoring step detects a fault condition when at least one said measurement is outside a predetermined threshold or range.

77. (Presently amended) A method of identifying a device having an impedance characteristic as a function of frequency, the method comprising:

applying at least two frequency signals to said device;

obtaining measurements indicative of the voltage across said device and the current flowing through said device at said frequencies;

processing said measurements in a multiplicative and non divisional manner to determine if a first ~~factor related to the~~ impedance or part of the impedance of the device at a

first frequency has a predefined inequality relationship with a second ~~factor related to the~~ impedance or part of the impedance of the device at a second frequency, without calculating either impedance; and

identifying the device in dependence upon the predefined inequality relationship.

78. (Presently amended) A method according to claim 77, wherein said predefined inequality relationship defines whether ~~said~~ a first factor related to the first impedance is greater than or less than ~~said~~ a second factor related to the second impedance times a predetermined constant, said constant being predetermined for identification of the device.

79. (Original) A method according to claim 77, wherein said first frequency is below a frequency at which eddy currents are small in the device.

80. (New) A method according to claim 66, further comprising:

determining the complex conjugate of the fifth and seventh parameters to generate ninth and tenth parameters respectively;

determining the square of the sixth and eight parameters to generate eleventh and twelfth parameters respectively;

wherein the step of performing a comparison comprises comparing the product of values relating to the fifth, ninth and twelfth parameters with the product of values relating to the seventh, tenth and eleventh parameters.

81. (New) A method according to claim 66, wherein the step of performing a comparison comprises comparing the product of the fifth, ninth and twelfth parameters with a constant multiplied by the product of the seventh, tenth and eleventh parameters.